

REMARKS

Applicants gratefully acknowledge the withdrawal of the objections to claims 1 -19 and the withdrawal of the rejections of claims 5 and 6 under 35 USC second paragraph.

Claims 1-20 are pending in the application. No claims have been amended and no new matter has been added.

Double Patenting Rejection

Claims 1-19 were provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 10-24 of copending Application No. 10/549,624.

Claims 1-19 were provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-11 of copending Application No. 10/486,893.

Terminal disclaimers, which disclaim the statutory term of any patent resulting from the instant application that is beyond the statutory term of any patent resulting from either of the two cited applications are submitted herewith. Reconsideration and withdrawal of the rejection is respectfully requested.

Rejection of claims 1-20 under 35 U.S.C. §103(a)

Claims 1 -19 have been rejected under 35 USC 103(a) as being obvious over Moritz.

Independent claim 1 recites elements not found in the prior art. Specifically, claim 1 recites that the cross section of the reaction volume initially increases at least over part of a length of the rotor in an area adjacent the inlet and the cross section of the reaction volume does not increase at least over part of the length of the rotor in an area adjacent the outlet. Moritz neither teaches nor suggests this recitation of independent claim 1.

Independent claim 20 recites that, the reactor housing in the area of the rotor has a first section and a second section, the first section having a cross section of the reaction volume that

increases as the reaction volume extends from the inlet to the outlet, and the second section having a cross section of the reaction volume that increases as the reaction volume extends from the inlet to the outlet to a lesser extent than the increase of the first section. Moritz neither teaches nor suggests this recitation of independent claim 20.

Claims 2-19 are dependent upon claim 1 and are allowable for the reasons set forth above in response to the rejection of claim 1. Reconsideration and withdrawal of the rejection is respectfully requested.

1. No prima facie case of obviousness has been made

MPEP 2142 provides that an office action bears the initial burden of factually supporting any *prima facie* case of obviousness; and if the office action does not produce a *prima facie* case, the Applicant is under no obligation to submit evidence of obviousness. Furthermore, MPEP 2143.01 provides that the mere fact that a modification can be made is legally insufficient to establish a *prima facie* case of obviousness.

The office action indicated that Moritz discloses all of the basic essential features of the claims and that other non-disclosed features are considered non-essential – such as those recited above. Applicants have also been invited to submit evidence to support the prior argument made. Applicants respectfully submit that a *prima facie* case of obviousness has not been made and additional evidence in support of the argument is thus not necessary. Indeed, the office action **completely ignores structural recitations in the claims** that are not found in the cited prior art, labeling them as “non-essential features”. Limitations in claims distinguishing over the prior art cannot be ignored. *In re Boe et al.*, 184 U.S.P.Q. 38 (C.C.P.A. 1974).

Moreover, the PTO's statements are in direct contrast to Applicants' teachings. As disclosed and taught in the instant specification, the claimed features of Applicants' invention provide unique and surprising results. As such, good and sufficient reasons for the unique geometry of Applicants' claimed invention have been previously stated (and are repeated in the following paragraph below) and no *prima facie* case has been made. The mere allegation that the differences between the claimed subject matter and the prior art are obvious does not create a

presumption of unpatentability which forces an applicant to prove conclusively that the Patent Office is wrong. *In re Soli*, 137 U.S.P.Q. 797 (CCPA 1963).

The geometry recited in independent claims 1 and 20 solves the problem occurring during bulk polymerization wherein an adverse reaction regime may result in considerable quantities of residual monomers, which must then be discharged from the Taylor reactor. Without the proper geometry, there may also be instances of coagulation and polymer deposition, which in some cases may even lead to blockage of the reactor or of the product outlet. With the claimed invention, it is possible to obtain the desired products, as for instance polymers having comparatively narrow molar mass distribution.

2. Evidence of Non-obviousness is of record in the present application

Alternatively, Applicant respectfully submits that evidence of non-obviousness is already of record in the present application, as discussed below.

The office action states that Applicant has failed to provide evidence to support the arguments above. However, sufficient evidence is found, *inter alia*, in the specification of the application. The inventors have declared the facts therein, in compliance with 37 CFR 1.132, having executed a declaration as part of the subject application.

The disclosure of the present application cites and distinguishes Moritz (identified as DE 198 28 742 A1), at page 4, line 11 to page 5, line 19.

DE 198 28 742 A1 discloses a Taylor reactor which in order to solve these problems has been given

- a) an external reactor wall located within which there is a concentrically disposed rotor, a reactor floor, and a reactor lid, which together define the annular reaction volume,
- b) at least one means for metered addition of reactants, and
- c) a means for the discharge of product,

where there is a widening, in particular a conical widening, in the annular reaction volume in the flow direction. As a result, the known Taylor reactor is able substantially to solve the problem of maintaining the Taylor flow when there is a sharp increase in the kinematic viscosity ν in the reaction medium.

In this known Taylor reactor, the annular reaction volume is defined by the concentrically disposed rotor, the reactor floor, and the reactor lid. This means that the product outlet has to be disposed on the side of the Taylor reactor or in the reactor lid, and cannot be designed without edges. With this configuration, however, it is difficult to realize undisrupted product discharge.

Owing to the deleterious interaction of flow and geometric configuration, on the one hand, the known Taylor reactor is still unable to solve all of the safety and engineering problems which occur in the course of bulk polymerization and, on the other hand, **it is still not possible to increase the monomer conversion to an extent such that substantial freedom from monomers and a narrow molecular weight distribution and molecular weight polydispersity of the polymers are achieved.** [Emphasis Added]

As can be seen, Applicants have already described how the Taylor reactor of Moritz is unable to solve the problems which occur in the course of bulk polymerization. Specifically, it is not possible to increase the monomer conversion to an extent such that substantial freedom from monomers and a narrow molecular weight distribution and molecular weight polydispersity of the polymers is achieved.

The specification then goes further to declare the advantages of the Taylor reactor of the subject application. The specification of the invention at page 7, line 19 to page 9, line 10 states:

Surprisingly it has been found that, with a Taylor reactor in which the reactor housing and/or the rotor are configured such that the cross section of the reaction volume rises, at least to start with, from the inlet to the outlet but in the direction of the outlet – that is, in the flow direction of the reaction medium – there is a decrease in the rise, at least over part of the length of the rotor, it is possible to achieve a marked reduction in the polydispersities. One possible explanation for this effect is the reduction or even prevention of short-circuit flows at the edges delimiting the reaction volume, which may form if the Taylor vortices do not extend up to the edges. By “short-circuit flow”, therefore, is meant a flow within the reactor in the flow direction of the reaction media, which partially circumvents the mixing operation and so reduces the residence time in the reactor, leading to lower degrees of polymerization.

Experiments have shown that the Taylor reactor of the invention is, surprisingly, suitable for all conversions where there was a sharp change in the kinematic viscosity ν of the reaction medium in the flow direction.

Particularly surprising is that the Taylor reactor of the invention and the process of the invention allow the free-radical, anionic, and cationic (co)polymerization, graft copolymerization, and block copolymerization (referred to collectively as “polymerization”) of olefinically unsaturated monomers in bulk with conversion rates >70 mol%. Even more surprising is that conversion rates >98 mol% can be obtained without problems in the Taylor reactor of the invention without the formation of disruptive gas bubbles and/or the deposition of (co)polymers, graft copolymers, and block copolymers (referred to collectively as “polymers”).

A further surprise is that the Taylor reactor of the invention and the process of the invention allow a particularly safe bulk polymerization reaction regime, allowing the polymers to be produced very safely, reliably, and reproducibly. Owing to the very low levels of monomer in the polymers, they can be put to a very wide variety of end uses without additional purification and without the occurrence of safety, engineering, toxicological or environmental problems or odor nuisance. [Emphasis Added]

As can be seen, Applicants have already described how the problems associated with using the reactor disclosed in Moritz are solved when the Taylor reactor of the present invention is used. Specifically, it is possible to achieve a marked reduction in the polydispersities. Reconsideration and allowance of claims 1- 20 is respectfully requested.

CONCLUSION

Applicant(s) respectfully submit that the Application and pending claims 1 -20 are patentable in view of the foregoing remarks and citation to evidence already in the record. A Notice of Allowance is respectfully requested. As always, the Examiner is encouraged to contact the Undersigned by telephone if direct conversation would be helpful.

Respectfully Submitted,

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